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EXAMINER	
WONG, EDNA	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	**Application No.** 10/677,548	**Applicant(s)** COHEN, ADAM L.	
	Examiner Edna Wong	**Art Unit** 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *37-64* is/are pending in the application.

4a) Of the above claim(s) *60-64* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *37-59* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Election/Restrictions

Applicant's election without traverse of Group **I**, claims **37-59**, in the reply filed on April 2, 2007 is acknowledged.

The requirement is still deemed proper and is therefore made FINAL.

Accordingly, claims **60-64** are withdrawn from consideration as being directed to a non-elected invention.

Specification

The disclosure is objected to because of the following informalities:

page 1, line 3, the phrase -- , now US Patent No. 6,790,377, -- should be inserted after the year "2000".

page 1, line 4, the word "priority" should be amended to the word -- benefit --.

page 20, line 17, the words -- (not shown) -- should be inserted after the number "34".

page 20, line 17, the words -- (not shown) -- should be inserted after the number "36".

page 20, line 23, the words -- (not shown) -- should be inserted after the number

"46".

page 20, line 28, the words -- (not shown) -- should be inserted after the number "35".

page 26, line 15, reference character "85" has been used to designate both a rotating lapping plate and a central disk (from page 26, line 11). It is unclear what reference character "85" designates.

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claim **37** is objected to because of the following informalities:

Claim 37

line 5, the ";" (semicolon) [second occurrence] should be deleted.

line 10, the ";" (semicolon) [second occurrence] should be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

I. Claims **37-59** are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for *electrodepositing*, does not reasonably provide enablement for *electroless depositing*. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

Claim 37

lines 6 and 11, recite "depositing".

The word "depositing" reads on non-electrolytic depositing. However, Applicant's specification discloses that the invention relates to forming structures by electrochemical deposition (page 1, [4]).

Thus, the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

II. Claims **37-59** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 37

lines 9-10, it appears that the “first material” is the same as the first material recited in claim 37, line 6. However, it is unclear if it is. If it is, then it is suggested that the word -- the -- be inserted after the words “and/or”.

Claim 45

line 2, it appears that “removing a portion of at least one of the deposited materials” is further limiting the “method … comprising” recited in claim 37, lines 1-2. However, it is unclear if it is. If it is, then it is suggested that the word -- further -- be inserted before the word “comprises”.

Claim 52

lines 1-2, “*the at least one of* the first, second, or third materials” lacks antecedent basis.

III. Claims **37-59** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the multi-layer three-dimensional structure.

Claim 37

lines 1-2, recite "A method for fabricating a multi-layer three-dimensional structure" in the preamble. However, the body of the claim does not recite any three-dimensional structure.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims **37-59** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims **1-53** of U.S. Patent No. 6,475,369 B1 (Cohen). Although the conflicting claims are not identical, they are not patentably distinct from each other because:

The Cohen patent claims:

1. An electroplating method comprising: forming a layer comprising: a) contacting a substrate with a first article, the first article comprising a support and a first conformable mask disposed in a pattern on said support; b) electroplating a first metal from a source of metal ions onto said substrate in a first pattern, said first pattern substantially corresponding to the complement of said first conformable mask pattern; and c) removing said first article from said substrate; and (ii) building additional layers adjacent to and adhered to previously formed layers, using one or more articles that may be identical to or different from the first article.

5. A method for manufacturing an element comprising: a) forming a multi-layer structure by repeatedly forming layers, said step of forming said layers comprising: i) contacting a substrate with an article, the article comprising a support and a conformable mask disposed in a pattern on said support; ii) electroplating a first metal from a first metal ion source in a deposition pattern onto said substrate, said deposition pattern substantially corresponding to the complement of said conformable mask pattern; iii) removing said article from said substrate; and iv) electroplating a second metal from a second metal ion source onto said substrate; and b) removing at least a portion of at least one of said metals from said multi-layer structure to form the element.

7. A method of forming a structure comprising: obtaining a preformed patterned mask; bringing said mask into contact with a substrate; applying an electrical current across a conductive bath in the presence of said substrate, said conductive bath having a property to pattern said substrate in the presence of said electrical current where patterned portions of said mask are not in contact with said substrate; removing said mask from contact with said substrate; and repeating said bringing, said applying, and said removing, to form a structure from a plurality of at least partially overlaid layers of patterning.

32. A method for fabricating a multi-layer 3-dimensional (3-D) structure according to a 3-D description, comprising: processing said 3-D description to obtain a plurality of 2-dimensional (2-D) descriptions of cross sections of said 3-D structure; fabricating one or more selective electrodeposition masks each corresponding to at least one of said 2-D descriptions; ***using said selective electrodeposition masks***; and electrodepositing one or more materials to form structures corresponding to said 2-D descriptions in succession over a substrate.

39. A method of fabricating a three-dimensional element from at least one structural material, wherein the at least one structural material comprises one of a first electrodeposition material or a second electrodeposition material, wherein a sacrificial material comprises the other of the first electrodeposition material or the second electrodeposition material, and wherein the three dimensional element is formed from a plurality of electrodeposited layers, the method comprising: (a) providing a substrate which may include one or more previously deposited layers of a solidified material; (b) providing an electrodeposition source of the first electrodeposition material; (c) providing an electrodeposition source of the second electrodeposition material; (d) providing a plurality of preformed masks with negative features and with non-conductive positive features, wherein either the positive or negative features on each mask represents at least a portion of at least one cross-section of the three-dimensional element to be formed; (e) contacting a selected one of said preformed masks to a surface of said substrate thereby forming a non-conductive barrier over a portion of the surface of the substrate; (f) while the mask and the surface of the substrate are in contact with the first electrodeposition source, providing electric power to the electrodeposition source in a manner to cause deposition of the first electrodeposition material onto the surface of the substrate, in a pattern corresponding to the

> negative features of the selected mask, to form a portion of an electrodeposited layer; (g) separating the selected mask from said substrate; (h) ***performing at least one additional electrodeposition operation to complete formation of a electrodeposited layer wherein the at least one additional electrodeposition operation comprises deposition of the second electrodeposition material***; (i) repeating (e) through (h) a plurality of times to form additional layers adjacent to and adhered to previously formed layers of the three-dimensional element ***wherein at least one selected mask is used in the formation of each layer***, and wherein at least a portion of the selected masks are different for at least a portion of the layers; (j) separating the structural material from at least a portion of the sacrificial material to yield the three-dimensional element.

The claims of the instant application fail to be patentably distinct from the claims of the patent because the independent claims of the instant application recites similar limitations, either alone or in combination with their dependent claims, as that of the claims of the copending application wherein the claims of the instant application are encompassed by the claims of the patent. Therefore, the claims are obvious variants over each other.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

I. Claims **37-40, 45-46, 49-56 and 59** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Pan et al.** (US Patent No. 5,011,580).

Pan teaches a method for fabricating a multi-layer three-dimensional structure, comprising:

(i) forming a first layer, comprising:

(a) providing a first mask **26** (= a photoresist) in contact with a substrate **12, 14, 24**, wherein the mask has a first pattern of openings therein (col. 3, lines 45-57; and Fig. 4];

(b) depositing a first pattern of a first material **28** (= a copper base) from a source of the first material (= from electroplating) onto said substrate using the first mask to form a portion of a first layer (col. 3, lines 58-63; and Fig. 5);

(c) removing the first mask from the substrate (col. 3, lines 64-65; and Fig. 6);

(d) providing a second mask **30** (= a thick layer of photoresist) in contact with the substrate, and/or first material (Fig. 7), wherein the mask has a second pattern of openings therein (col. 3, line 66 to col. 4, line 3; and Fig. 8);

(e) depositing a second pattern of a second metal **32** (= an electrically conductive pillar) from a source of the second material (= from electroplating) onto said substrate and/or the first material using the second mask to form a portion of the first layer (col. 4, lines 4-10; and Fig. 9);

(ii) removing the second mask from the substrate and/or first material (col. 4, lines 11-14; and Fig. 10); and

(iii) building additional layers adjacent to and adhered to previously formed layers (= if desired additional levels of conductors and reference planes can be fabricated by repeating the above-described sequence of operations) [col. 5, lines 15-30; and Fig. 15].

The first material **28** is a first metal (= copper) [col. 3, lines 58-63].

The second metal **32** is a second metal (= copper-nickel and nickel alloys) [col. 4, lines 4-10].

The first (= copper) [col. 3, lines 58-63] and second (= copper-nickel and nickel alloys) [col. 4, lines 4-10] metals are different.

The second patterned mask **30** contacts both the substrate **12, 14, 24** and the first material **28** (Fig. 8).

The forming of the first layer comprises removing a portion (= planarizing) of at least one of the deposited materials (= tops of the metal pillars **32**) [col. 4, lines 57-68; and Fig. 14].

The removing is performed during a process of planarizing a surface of the first layer (= tops of the metal pillars **32**) [col. 4, lines 57-68; and Fig. 14].

The forming of the first layer additionally comprises depositing a third material **34** (= a protective overcoat) onto the substrate and/or onto one or both of the first or second materials (col. 4, lines 53-56; and Fig. 12].

At least one of the first, second, or third materials comprises a structural material (= copper) [col. 3, lines 58-63; and col. 4, lines 4-10].

At least one of the first, second, or third materials comprises a sacrificial material (= copper) [col. 3, lines 58-63; and col. 4, lines 4-10].

At least two of the first, second, and third materials are the same material (= copper) [col. 3, lines 58-63; and col. 4, lines 4-10].

A plurality of the materials deposited in separate deposition operations are the same and wherein the plurality of depositions result in the complete patterning of a desired material on the first layer (= if desired additional levels of conductors and reference planes can be fabricated by repeating the above-described sequence of operations) [col. 5, lines 15-30; and Fig. 15].

The complete patterning is formed by complementary patterned depositions (Figs. 5 and 9).

The second patterned mask contacts both the substrate and the first material (Fig. 8).

II. Claims **37-41, 45-46, 49-56 and 59** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Yee** (US Patent No. 4,920,639).

Yee teaches a method for fabricating a multi-layer three-dimensional structure, comprising:

(i) forming a first layer, comprising:

(a) providing a first mask **18** (= a photoresist) in contact with a substrate **10, 12, 14, 16**, wherein the mask has a first pattern of openings therein (= selectively patterned) [col. 3, lines 18-28; and Fig. 2];

(b) depositing a first pattern of a first material **20** (= a second electrically conductive layer) from a source of the first material (= from electroplating) onto said substrate using the first mask to form a portion **22, 24** (= sections) of a first layer (col. 3, lines 29-41; and Fig. 3];

(c) removing the first mask from the substrate (= the first resist layer **18** can be stripped and a total of 26 microns of resist **26** can be spun on) [col. 3, lines 50-52];

(d) providing a second mask **26** (= resist) in contact with the substrate, and/or first material, wherein the mask has a second pattern of openings therein (= photopatterned) [col. 3, lines 42-52; and Fig. 4];

(e) depositing a second pattern of a second metal **28** (= a conductor) from a source of the second material (= from the application) onto said substrate and/or the first material using the second mask to form a portion (= another part) of the first layer (col. 3, lines 52-59; and Fig. 5);

(ii) removing the second mask **26** from the substrate and/or first material (col. 4, lines 55-57; and Fig. 11); and

(iii) building additional layers adjacent to and adhered to previously formed layers

(= the steps described above can be repeated in sequential manner until the desired number of levels for the interconnect are obtained) [col. 4, lines 5-54; and Figs. 6-10].

The first material **20** is a first metal (= copper) [col. 3, lines 31-32].

The second metal **28** is a second metal (= copper) [col. 3, lines 52-55].

The first (= copper) [col. 3, lines 31-32] and second (= copper) [col. 3, lines 52-55] metals are the same.

The first and second metals are different (= instead of copper, any electrodepositable metal may be used, such as for example, gold) [col. 2, lines 42-44].

The forming of the first layer comprises removing a portion of at least one of the deposited materials (= a planarization plating process) [col. 3, lines 55-59].

The removing is performed during a process of planarizing a surface of the first layer (= the copper pillars **28** should be plated nearly flush with the surface of the resist **26**) [col. 3, lines 55-59].

The second patterned mask contacts both the substrate and the first material (Fig. 4).

The forming of the first layer additionally comprises depositing a third material **42** (= a copper seed layer) onto the substrate and/or onto one or both of the first or second materials (col. 4, lines 10-16).

At least one of the first **20**, second **28**, or third materials **42** comprises a structural material (= copper) [col. 3, lines 31-32; col. 3, lines 52-55; and col. 4, lines 10-16].

At least one of the first, second, or third materials comprises a sacrificial material

(= copper) [col. 3, lines 31-32; col. 3, lines 52-55; and col. 4, lines 10-16].

At least two of the first, second, and third materials are the same material (= copper) [col. 3, lines 31-32; and col. 3, lines 52-55].

A plurality of the materials deposited in separate deposition operations are the same and wherein the plurality of depositions result in the complete patterning of a desired material on the first layer (= the steps described above can be repeated in sequential manner until the desired number of levels for the interconnect are obtained) [col. 4, lines 5-54; and Figs. 6-10].

The complete patterning is formed by complementary patterned depositions (Figs. 3 and 5).

The second patterned mask **26** contacts both the substrate and the first material (Fig. 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **42-44** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Yee** (US Patent No. 4,920,639) as applied to claims 37-41, 45-46, 49-56 and 59 above, and further in view of **Mastrangelo** (US Patent No. 3,926,916).

Yee is as applied above and incorporated herein.

The method of Yee differs from the instant invention because Yee does not disclose the following:

a. Wherein at least one of the first or second materials comprises a polymer, as recited in claim 42.

b. Wherein at least one of the first or second materials comprises a ceramic, as recited in claim 43.

c. Wherein at least one of the first or second materials comprises a semiconductor, as recited in claim 44.

Like Yee, Mastrangelo teaches forming an array of conductive paths (col. 9, lines 4-9). Mastrangelo teaches a dispersed potentially conductive particulate filler and a polymeric binder, which composition can provide closely spaced, electrically conductive paths when subjected to suitable electrical treatment (col. 1, lines 44-54). The filler particles used in the composition are non-conductive, but are capable of becoming conductive upon exposure to an activating electrical potential. The electrically conductive interior of the filler particle can be a metal or semiconductor (col. 5, lines 15-54).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Yee with wherein at least one of the first or second materials comprises a polymer; wherein at least one of the first or second materials comprises a ceramic; and at least one of the first or second materials comprises a semiconductor because such materials are capable of becoming conductive upon exposure to an activating electrical potential and would have prevented cross-talk when paths are formed close together as taught by Mastrangelo (col. 1, lines 22-29; and col. 1, line 55 to col. 2, line 6).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edna Wong

Edna Wong
Primary Examiner
Art Unit 1753

EW
April 27, 2007